

第20回

先端半導体セミナー

The 20th Advanced Semiconductor Seminar



日程

2026年11月9日(月)



場所

工学部百周年記念館

午前の部

10:30 - 12:00

Prof. C.T. Liu

国立清華大学 兼任教授 / YTEC 取締役

< 主な略歴 >

プリンストン大学 電気工学博士。Daniel C. Tsui教授(1998年ノーベル物理学賞受賞)の指導を受ける。AT&T Bell Laboratoriesを経て、工業技術研究院(ITRI) 副院長などを歴任。半導体・ナノトランジスタ、フレキシブルエレクトロニクス、光電融合デバイスなどの先端技術研究を牽引。Bell Labs President's Gold Awardを受賞。

題目

The Significance of Advanced Research in Semiconductor and High-Tech Industries

主要キーワード

- ナノトランジスタの進化
- Fin-FET
- フレキシブル生体医療センサー
- 光電融合トランジスタ

午後の部

13:00 - 14:30

Prof. Bang-Ning Hwang

国立雲林科技大学 管理学院長・教授

< 主な略歴 >

現在、国立雲林科技大学(YunTech) 管理学院長・企業管理系教授。台湾のハイテク産業政策や半導体エコシステム、TSMCをはじめとするグローバル・サプライチェーン戦略および経営革新(オープンイノベーション)に関する研究・教育に精通し、産学連携の推進においてリーダーシップを発揮している。

題目

The Evolution of TSMC: From a Taiwanese Startup to the World's Semiconductor Leader

主要キーワード

- 専業ファウンドリモデル
- 製造の卓越性
- グローバルサプライチェーン
- AI時代のエコシステム

午前の部

10:30 - 12:00

Prof. C.T. Liu

The Significance of Advanced Research in Semiconductor and High-Tech Industries

Abstract

The lecture will begin with three crucial research topics that have paved the way for the development of nano-transistor and system-on-a-chip technologies. These topics include the formation of extremely thin oxide layers, the modification of electron mass, and the advancement of fin-FET technology.

The second topic will look into the advanced research in flexible electronics. It explores the applications of robotic eyes, brain monitors, and newborn vital-sign monitoring systems.

The third topic emphasizes the significance of advanced research in driving technology and economic development, as well as enhancing an enterprise's data competence. We will draw examples from our daily lives, such as intelligent hospitals, osteoid medical casts, and diabetes fundus image decision support systems, to illustrate these concepts.

The final topic will highlight the fundamental limitations of semiconductor technologies, specifically the transistor itself. It will then introduce the photovoltaic transistor, which replaces the transistor gate electrode with an optical gate. This innovation enables the direct conversion of data signals in optical fibers into electric signals in semiconductor chips, potentially bringing benefits to our living environment.

午後の部

13:00 - 14:30

Prof. Bang-Ning Hwang

**The Evolution of TSMC:
From a Taiwanese Startup to the
World's Semiconductor Leader**

Abstract

Since its establishment in 1987, Taiwan Semiconductor Manufacturing Company (TSMC) has transformed the global semiconductor industry and become the world's leading dedicated semiconductor foundry. This talk explores TSMC's evolutionary journey, the competitive advantages behind its success, and its global impact and future challenges.

First, The Evolution of TSMC examines how TSMC pioneered the Pure-Play Foundry business model and contributed to the emergence and growth of fabless semiconductor companies. It also traces TSMC's evolution toward Open Innovation and ecosystem development.

Second, The Competitive Advantages of TSMC explores the key factors underlying its sustained success, including business model innovation, technological leadership, manufacturing excellence, customer trust, and ecosystem development.

Finally, TSMC's Global Impact and Future Challenges considers how TSMC has reshaped the global semiconductor value chain and its growing strategic importance amid the rapid development of artificial intelligence, geopolitical tensions, and the globalization of semiconductor manufacturing.

The talk provides an integrated perspective on how TSMC has built and sustained its global competitive advantage over nearly four decades.